**Precalculus**

**Notes 2.4**

**Complex Numbers**

Definition: a complex number is any number that can be written in the form “a + bi” where a and b are real numbers and “i” is the imaginary unit. The “a” is called the real part and the “bi” is called the imaginary part.

Ex. 1 3 + 2i a = 3 bi = 2i so b = 2

Ex.2 4 – 6i a = b =

Ex. 3 If a + bi = c + di then,

a = b =

**I. Equal Complex Numbers:**

1. Find the values for “x” and “y” so that:

3x + 2yi = 12 + 8i

2. Find the values for “x” and “y” so that:

2x + 3yi = 18 + 9i

3. Find the values for “x” and “y” so that:

4x – 6yi = 16 – 18i

4. Find the values for “x” and “y” so that:

10x – 5yi = 20i + 30

5. Find the values for “x” and “y” so that:

3x + (x + y)i = 9 – 10i

6. Find the values for “x” and “y” so that:

2x + (x – y)i = 8 + 12i

**II. Adding and Subtracting Complex Numbers:**

1. 6i + 2i

2. 12i – 2i

3. 17i + 25i

4. 6i + 2i2

5. (2 + 3i) + (4 + 6i)

6. (3 – 4i) + (2 + 5i)

7. (6 – i) – (-2 – -4i)

8. (2 + ) + (4 + )

9. 3(2i – 6) – 5(-4 – 8i)

**III. Multiplying Complex Numbers:**

10. (3 + 5i)(3 – i)

11. (3 + i)(3 – i)

12. (4 – 3i)2

13. 

14. (-5 + 7i)2

15. (2)(-3)

16. (-4i)(6i)2

1. **Simplify – Rationalizing the Denominator:**

1.  2.  3. 

4.  5.  6. 

7.  8. 

9.  10. 

1. **Give the multiplicative inverse (reciprocal) of each number below:**

1.  2. -6

3. 2 + i 4. -5i

5.  6. 